

THE PASPALUM DISTICHUM - P. VAGINATUM SPECIES PAIR IN BARBADOS (POACEAE)

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Holder, Ayanda & Rogers, George (University of the West Indies, Dept. of Biological & Chemical Sciences, Cave Hill, Barbados). The *Paspalum distichum* - *P. vaginatum* species pair in Barbados (Poaceae). *Moscosa* 10: 47-56. 1998. *Paspalum vaginatum* and *P. distichum* are a widespread and confusingly similar species pair with a convoluted nomenclatural history. The morphological, distributional, and ecological distinctness of the pair are documented for Barbados. A nomenclatural history, descriptions, key, and habitat salinity data are supplied.

Key words: *Paspalum*, ecology, Barbados, taxonomy, habitat and salinity.

Paspalum distichum y *P. vaginatum*, hierbas ampliamente distribuidas en la Isla de Barbados, con frecuencia tratadas como una sola especie. La morfología, distribución y las distinciones ecológicas de este par de especie son documentadas para Barbados. Además, se ofrece la historia nomenclatural, descripciones, claves y datos de habitat en salinidad.

Palabras clave : *Paspalum*, ecología, Barbados, taxonomía, habitat y salinidad.

The cosmopolitan grass genus *Paspalum* L. comprises some 400 species, primarily in warm climates. Its spikelets characteristically have the first glume absent, a large second glume, a sterile lemma, and a leathery to indurate fertile lemma and palea. Approximately 27 species reside in the Lesser Antilles (Gould) with seven in Barbados. One species pair has emerged as of special interest during a study of Barbados grasses due to their similarity, unsettled nomenclatural history, and disagreements concerning their distinction. *Paspalum distichum* L. (Fig. 1) and *P. vaginatum* Sw. (Fig. 2) look sufficiently similar upon herbarium or field examination to be perceived (in our opinion incorrectly) as a single species.

Authors note almost consistently that *P. vaginatum* has glabrous glumes in contrast with the pubescent glumes of *P. distichum*. Additional alleged differences turn up variably, inconsistently, and contradictingly in different floristic works. Most of these do not hold true in Barbados. Reported differences include freshwater habitats for *P. distichum* (vs. saline habitats for *P. vaginatum*); one central nerve in the second glume of *P. distichum* (vs. two nerves in *P. vaginatum*); pubescent sterile lemmas in *P. distichum* (vs. glabrous sterile lemmas); curved spikes in *P. distichum* (vs. straight spikes); hispid pubescence on the lower nodes in *P. distichum* (vs. glabrous lower nodes); subopposite spikes with one sessile in *P. distichum* (vs. the spikes strictly opposite and all pedunculate); flat sessile spikelets in *P. distichum* (vs.



Fig. 1. *Paspalum distichum* in freshwater stream at Bathland, St. Jhon, Barbados (Holder 97-13).

plump spikelets); and the middle nerve of the sterile lemma prominent in *P. distichum* (vs. the nerve obscure).

Authors who recognize the two as distinct species include: Adams, Fournet, Gooding et al., Gould, Hitchcock & Chase, Manidool, Pohl, Proctor, and Sauget & Liogier. Yet salted through these and other works are remarks on the close relationship between the two and on difficulties in distinguishing them. A consequence of the latter is a lack of consensus concerning distinguishing characteristics.

Correll & Correll merged the two into synonymy and provided a short discussion based on Bahamian specimens. They reported inconsistency in spikelet size, in "presence or absence of midrib", and in unspecified "other characters" that have been used to separate the two species in the past. Their discussion implies that the only materials examined had glabrous glumes, hinting that the failure to perceive two distinct entities might have rested on examination of *P. vaginatum* alone.



Fig. 1. *Paspalum distichum* in Christ Church, Barbados. Lefthand photo: *P. vaginatum* on Casuarina Beach (Holder 97-16). Righthand photo: *P. vaginatum* in interior of Graeme Hall Swamp (Holder 97-1, Holder 97-9).

We examined living and herbarium material collected in Barbados (Fig. 3) and checked habitats, pubescence on the second glumes, sheath base pubescence, spike shapes, numbers of veins in the second glumes, shapes of second glumes, pubescence on leaf sheath margins, textures of fertile lemmas, culm cross sections, flatness vs. plumpness of spikelets, whether or not both spikes are pedunculate, and presence or absence of an apical tuft of hair on the fertile lemma (Table 1). The characters that gave specific distinction without exception were freshwater habitats and pubescent glumes for *P. distichum* vs. saline habitats and glabrous glumes for *P. vaginatum*. Noteworthy tendencies undermined by exceptions were curved young spikes, bony fertile lemmas at anthesis, pubescent sheath margins, glumes widest above the middle, and one spike sessile in *P. distichum* as opposed to straight young spikes, leathery fertile lemmas, glabrous sheath margins, glumes widest at or below the middle, and all spikes pedunculate in *P. vaginatum*. The remaining characters from the literature did not hold up.

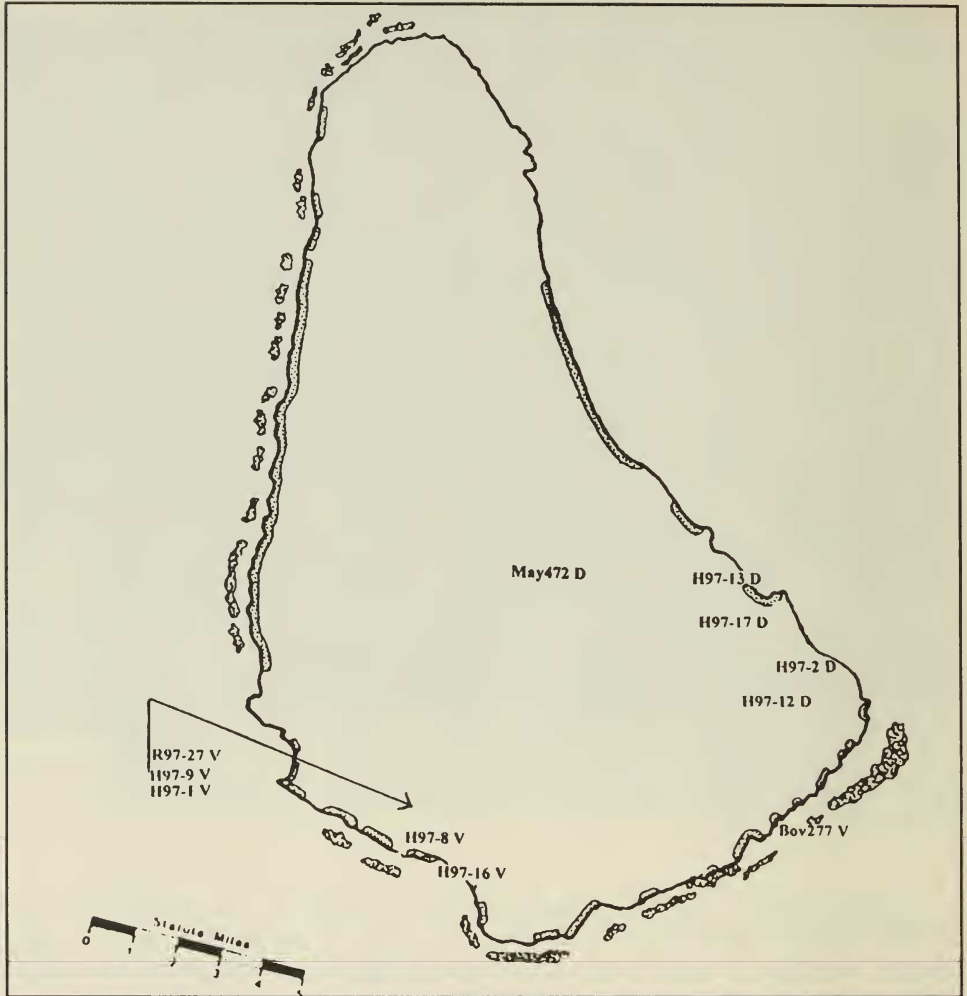


Figure 3. Map of Barbados (N at top), showing collection localities for *Paspalum distichum* and *P. vaginatum*. The left end of each abbreviation marks the locality. R = Rogers, H = Holder, May = Mayers, Bov = Bovell, V = *P. vaginatum*, D = *P. distichum*.

In Barbados *Paspalum distichum* has been found exclusively in freshwater streams flowing toward the sea on the East Coast, and in one inland drainage ditch. (Manidool reported *P. distichum* elsewhere to tolerate salty water). *Paspalum vaginatum*, by contrast, is restricted to saline habitats in Barbados, either beach sand or standing brackish water. The latter sites are in Graeme Hall Swamp on the south coast in the parish of Christ Church. One of these swamp sites is among white mangroves (*Laguncularia racemosa* (L.) Gaertn. f.) immediately inland from the sea

Table 1
 Tabulation of collections and characters of taxonomic interest for
Paspalum distichum and *P. vaginatum* based on Barbados material.
 H = Holder, R = Rogers, Pub. = pubescent, dist = *P. distichum*, vag = *P. vaginatum*.

Specimen	Habitat	Glume Pub.	Sheath Base Pub	Spike Curved	Fertile Lemma Bony	Sheath Margin Pub	Fertile Lemma Tip Hair	Glume		Culm Solid	1 Midrib in Glume	1 Spike Sessile	Spikelet		Species
								Widest Above	Middle				Flat		
H97-12	fresh	yes	no	mixed	yes	yes	yes	no	yes	yes	yes	yes	no	no	dist
Mayers 472	fresh	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	yes	no	no	dist
H97-2	fresh	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	yes	no	no	dist
H97-13	fresh	yes	no	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	no	dist
H97-17	fresh	yes	mixed	yes	no	yes	yes	yes	yes	yes	yes	mixed	no	no	dist
R97-27	salt	no	no	no	no	no	no	no	no	no	no	no	no	no	vag
Bovell 277	salt	no	no	no	no	no	no	no	no	no	no	no	no	no	vag
H97-8	salt	no	no	no	no	no	no	no	no	yes	no	no	no	no	vag
H97-9	salt	no	no	no	no	no	yes	no	no	no	yes	mixed	no	no	vag
H97-1	salt	no	no	no	no	no	yes	no	no	no	no	no	no	no	vag
H97-16	salt	no	no	no	no	yes	no	no	no	yes	no	no	no	no	vag

and coastal road; the other standing-water site is in the interior of the swamp. We checked salinity for the aquatic *P. vaginatum* sites as well all extant *P. distichum* sites using an ATAGO Hand Refractometer Model S-10. One water sample was taken from each site, and three readings were made at 20 degrees C for each sample. The standing-water *P. vaginatum* sites were saline (Table 2). The water at the *P. distichum* sites was fresh (Table 2).

A brief nomenclatural history (based partly on Guedes) will help with interpretation of various floristic works in which *P. distichum* and *P. vaginatum* appear. Linnaeus was apparently the first botanist to have trouble distinguishing the two. The Linnaean type of *Paspalum distichum* (sheet 79/9) is a mixed collection of what are generally now held to be *P. distichum* and *P. vaginatum*. This was noticed by C. E. Hubbard (Adams, pers. comm.) and by Bor (1968, 1970). (See also Fosberg, who seems to have interpreted the Linnaean type of *P. distichum* as *P. vaginatum* alone.)

Table 2
Salinity data for *P. distichum* and *P. vaginatum* in Barbados.
GHS = Graeme Hall Swamp.

Species name	Specimen No.	Locality	Water Collection Date	Salinity (parts NaCl/1000)
<i>P. vaginatum</i>	H 97-8	GHS adjacent to sea	July 11, 1997	5, 4, 4
<i>P. vaginatum</i>	H 97-1, H 97-9, R 97-27	GHS interior	July 11, 1997	6, 6, 6
<i>P. distichum</i>	H 97-12	Three Houses stream	July 17, 1997	0, 0, 0
<i>P. distichum</i>	H 97-13	Bathland stream	July 17, 1997	0, 0, 0
<i>P. distichum</i>	H 97-17	Codrington College stream	July 17, 1997	0, 0, 0

Bor (1970, as related in Guedes) selected a plant on the Linnaean sheet to lectotypify the name *Paspalum distichum*. The plant selected had unsettling nomenclatural consequences, since it pertains to the species traditionally known as *P. vaginatum*. Hence that species had to have its name changed to the older *P. distichum* with *P. vaginatum* listed as a (nomenclatural) synonym. The species formerly known as *P. distichum* then needed a new name, the appropriate replacement being *P. paspalodes* (Michx.) Scribn. Thus the Bor lectotypification created the need to call one species by the name traditionally applied to the other and, worse, made it necessary to cite the two names as synonyms even when the two species usually known by those names are not regarded as conspecific. This was an incubation chamber for difficulties.

Guedes endeavored to correct this by overturning Bor's troublesome lectotypification and selecting a more suitable "type"—the second plant from the left on Linnaean sheet 79/9. Contrary to Bor's selection, the one by Guedes was an individual of the traditional *P. distichum* and thus preserved conventional application of the names *P. distichum* and *P. vaginatum*. Overturning a previous lectotypification merely because it is nomenclaturally inconvenient is not (and was not at the time) sanctioned by the International Code of Botanical Nomenclature (see the present Art. 9.13 in Greuter *et al.*). Guedes justified this apparent violation, asserting that Bor need not be followed because Bor was inadequately specific about the location of the selected plant on sheet 79/9. Guedes pointed out further that ICBN Rec. 7B (now 9A.5) advised selecting a lectotype to preserve current usage, although Art. 9.10 specifies that a lectotype chosen from a mixed collection must be the element that conforms most nearly with the protologue. With a few exceptions (Adams, Fosberg), most authors have continued the traditional application of the names, as have we. We are not in a position to examine all of the elements germane to the matter and hence can not judge which way absolute application of the ICBN would point. If further research shows Guedes to be in conflict with the rules, we would suggest conservation of *Paspalum distichum* with the Guedes lectotypification in order to prevent even more nomenclatural flip-flops. In the meantime, we feel preservation of current usage to be the more productive course.

Paspalum vaginatum and *P. distichum* in Barbados can be differentiated as follows:

1. Second glume pubescent; spikes often curved; fertile lemma usually bony at anthesis; glumes usually wider above the middle; one spike sessile and one pedunculate; occurrence in freshwater habitats—*P. distichum*

1. Second glume glabrous; spikes straight; fertile lemma leathery at anthesis; glumes usually wider at or below the middle; spikes pedunculate; occurrence in saline habitats—*P. vaginatum*

Paspalum distichum L., Syst. Nat. ed. 10, 2: 855. 1759.

Synonym: *Paspalum paspalodes* (Mich.) Scribn., Mem. Torrey Bot. Club 5: 29. 1894.

Stoloniferous grass rooting at the nodes, rising to ca. 0.5 m; stems and leaves nearly glabrous. Culm ca. 1 mm in diameter below the inflorescence. Leaf blades 3-9 cm long and 3-5 mm wide, sometimes with silky hairs near the blade-sheath junction. Leaf bases flattened and 2.5-5 cm long. Inflorescence consisting of 2(3) curved to sometimes straight spikes 2-5 cm long, bearing ca. 24-35 spikelets in 2 rows along one side of the rachis. Spikelets elliptic-lanceolate, 2-3 mm long. Second glume membranous, pubescent, elliptic to wider above the middle, with an acute apex. Sterile lemma resembling the second glume in shape, membranous, glabrous. Upper floret with usually bony lemma enclosing the palea, the lemma elliptic with an apical tuft of hair. Distributed very widely in warm (to sometimes temperate) regions around the world. In Barbados limited to freshwater habitats, sometimes with the stolons floating on the water surface.

Barbados. St. John. Bathland, near roadside bridge, freshwater stream flowing toward sea, growing on stream banks and into water at stream margins, 1 Jul 1997, Holder 97-13 (BAR); Codrington College, freshwater stream flowing through shaded lawn, on the stream bank and in the water, 11 Jul 1997, Holder 97-17 (BAR). St. Joseph. Andrews Plantation, roadside gutter, Jun 1936, Mayers 472 (BAR). St. Philip. Three Houses Stream (which flows all year), near end of stream, growing in water at stream margins with stolons extending across surface of water, 17 Jun 1997, Holder 97-2 (BAR) ; Three Houses Stream (at the source), just opposite park, growing on stream banks and in water at stream margins, 1 Jul 1997, Holder 97-12 (BAR).

Paspalum vaginatum Sw., Prodr. 21. 1788.

Extensively stoloniferous grass, rooting at the nodes, infrequently ascending to ca. 0.5 m. Culms glabrous to lightly pubescent, ca. 1 mm in diameter below the inflorescence. Leaves glabrous, leaf sheaths 4-7 cm long, imbricate, flattened and opened (not fused) for most of their length. Leaf blades 4-12 cm long and 2-3 mm wide. Inflorescence consisting of 2-6 spikes borne on short peduncles, the spikes 2.5-8 cm long, bearing ca. 34-50 spikelets arranged in 2 rows along either side of the rachis. Spikelets 2-4 mm long, ovate-elliptic. Second glume glabrous, elliptic to a little wider at or below the middle, acute at apex, membranous. Sterile lemma resembling the second glume in shape, glabrous or with some apical hairs, membranous. Fertile lemma elliptic, leathery, glabrous. Distributed around the world in warm coastal regions. In Barbados limited to saline habitats, often binding beach sand or in (with stolon floating upon) brackish water.

Barbados. Christ Church. Graeme Hall Swamp, 11 May 1997, Rogers 97- 27 (BAR); Graeme Hall Swamp, interior of swamp, adjacent to red mangroves, growing across water surface of muddy ditch, 11 Jun 1997, Holder 97-1 (BAR), 25 Jun 1997, Holder 97-9 (BAR); Graeme Hall Swamp, to the west of the South Coast Road entrance, adjacent to white mangroves, growing in wet substrate, Holder 97-8 (BAR); Casuarina Beach, on the sand, 11 Jul 1997, Holder 97-16 (BAR). St. Philip. Crane Beach, 27 Sep 1901, Bovell 277 (BAR).

Acknowledgments

Dr. Angela Fields graciously offered her laboratory for the water tests and instructed A. Holder in the technique involved. Dr. Louis Chinnery helped with photomicroscopy. Dr. Dennis Adams generously provided information and insights critical to the nomenclatural history. And gratitude is due Mr. John Thompson for access to the grounds of Codrington College

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